

PART 00600 - BASES

Section 00610 - Reconditioning Existing Roadway

Description

00610.00 Scope - This work consists of reconditioning and preparing existing subgrades, bases, surfacings and pavements on which an additional layer or course of material is to be placed, under the Contract. The work includes existing shoulders, cut ditches, road connections, approach roads, ramps, bridge decks if not provided for elsewhere, and other roadbed areas on which construction work under the Contract is to be performed.

Materials

00610.10 Materials - Materials required for reconditioning and preparation work may consist of selected soil, sand and gravel, aggregate subbase or base material, water, asphalt, asphalt and portland cement concrete surfacing, and other material as directed. Furnish the materials meeting the requirements of the Specifications of the applicable Sections.

00610.15 Quality Control - Provide quality control according to Section 00165.

Labor

00610.30 Quality Control Personnel - Provide technicians having CEBT, CAgT, and CDT technical certifications.

Construction

00610.40 Removal and Replacement of Unsuitable Materials - Remove unstable or unsuitable materials in the subgrade, subbase, base, surfacing or pavement areas as directed and dispose of according to 00330.41(a-3). Perform the removal and disposal according to 00140.30. Replace the removed materials with successive courses of materials furnished for other purposes under the Contract. Furnish, place and finish these materials as specified or as directed. If no materials are available for replacement, perform the replacement work according to 00140.30.

00610.41 Ditches and Subgrades - Clean, trim and restore existing cut ditches to designated cross section and condition. Reshape, water, process and prepare the existing subgrade to the lines, grades, slopes and cross sections established. Compact according to 00330.43.

00610.42 Aggregate Subbase, Base, and Surfacing - Reshape, water, process and prepare the upper layer of existing subbases, bases and surfacings to lines, grades and cross sections established. Compact to densities required for similar new work.

00610.43 Surfacings - Clean existing surfacings of all loose material, dirt and dust by brooming, flushing with water or other approved methods.

Measurement

00610.80 Measurement - No measurement of quantities will be made for reconditioning and preparation work.

Materials used in the replacement of unsuitable materials according to 00610.40 will be measured in the manner applicable to the pay item under which the materials are furnished.

Payment

00610.90 Payment - Payment for reconditioning and preparation work will be made at the Contract lump sum amount for the item "Reconditioning Existing Roadway".

Payment will be payment in full for furnishing all material, equipment, labor, and incidentals necessary to complete the work as specified.

Removal and disposal of unsuitable materials will be paid for according to 00140.30.

Materials used for replacement of unsuitable materials according to 00610.40 will be paid for at the Contract unit price for the material involved. If the Contract Schedule of Items does not identify pay items for the material, payment will be made according to 00140.30.

Water furnished and used in the watering work and in the flushing of surfaces and pavements will be paid for according to Section 00340. If the Contract Schedule of Items does not identify a watering pay item, no separate or additional payment will be made for water furnished and used in the watering work and in the flushing of surfaces and pavements.

When the Contract Schedule of Items does not indicate payment for the work under this Section, no separate or additional payment will be made. Payment will be included in payment made for the appropriate items under which this work is required.

Section 00620 - Cold Plane Pavement Removal

Description

00620.00 Scope - This work consists of removing existing pavement to prepare a foundation for placing new surfacing.

Equipment

00620.20 Equipment - Provide self-propelled planing machines or grinders:

- Capable of loosening pavement material.
- Capable of accurately establishing profile grades within a tolerance of 0.02 foot by reference from either the existing pavement or from independent grade control.
- With a positive means for controlling cross-slope elevations.
- With a totally enclosed cutting drum with replaceable cutting teeth.
- With an effective means of removing loosened material from the surface and preventing dust from escaping into the air.
- Capable of providing a true cross-slope grade that will allow placement of overlay pavement to a uniform thickness.

Construction

00620.40 Pavement Removal:

(a) General - Remove the existing pavement to the depth, width, grade and cross section shown or as directed. The use of a heating device to soften the pavement is not allowed. When removing pavement from bridge end panels, ~~the~~ limit the machine forward speed to 2.5 feet per minute.

Construct temporary wedges at transverse joints, intersections, driveways, and around structures according to 00620.40(d).

(b) Depth 1 inch to 2 inches - If the depth of the existing pavement to be removed is 2 inches or less, but more than 1 inch and the section will be under traffic, schedule the work so the full width and length of travel lanes pavement can be removed during the same shift. Remove the shoulder area within 24 hours.

(c) Depth over 2 inches - If the depth of the existing pavement to be removed is over 2 inches and the section will be under traffic, schedule the work so the full width and length of the travel lanes and shoulders can be removed, leaving no longitudinal or transverse drop-offs, during the same shift.

(d) Pavement Removal Alternative - If unable to complete the pavement removal according to 00620.40(b) and (c), then within the same day construct a wedge of asphalt concrete, at a slope of 1V:10H or flatter along each exposed longitudinal drop-off, and 1V:50H or flatter along each exposed transverse drop-off. Longitudinal drop-offs along gutters do not require wedges. Place wedges completely across the milled area at intersections, at each driveway, points of beginning and ending of the milling operation, and around manholes, valve boxes and other structures. Longitudinal drop-offs of 1 inch or less do not require a wedge. Maintain wedges as long as the area remains under traffic or until pavement is replaced. Remove and dispose of wedges before placing new pavement.

(e) Warning Signs - Provide warning signs as required where abrupt or sloped drop-offs occur at the edge of the existing or new surface according to Section 00225.

00620.41 Surface Tolerance - Test with a 12 foot straightedge furnished and operated by the Contractor, as directed. The variation of the top of the ridges from the testing edge of the straightedge, between any two ridge contact points, shall not exceed 1/4 inch.

00620.42 Disposal of Materials - Dispose of all materials according to 00290.20.

00620.43 Maintenance Under Traffic - If the cold planed pavement surface will be exposed to traffic, sweep and clean prior to allowing traffic to use the roadway. Areas of Cold Plane Pavement Removal greater than 2" deep shall be paved back to within 2" of finished grade within the same Work day as the cold plane pavement removal. All other cold plane depths 2 inches or less shall be paved within 5 Work Days of cold plane operations.

Measurement

00620.80 Measurement - The quantities of cold plane pavement removal will be measured on the area basis, in place.

When the depth of pavement to be removed is variable, the depth as shown is an estimate and is approximate only. No guarantee is made that the actual depth will be the same as the estimated depth.

Payment

00620.90 Payment - The accepted quantities of work performed under this Section will be made at the Contract unit price, per square yard or square foot, for the item "Cold Plane Pavement Removal, _____ Deep".

The depth will be inserted in the blank. If the depth is variable, the depth range will be inserted in the blank.

Payment will be payment in full for furnishing all equipment, labor, and incidentals necessary to complete the work as specified.

No separate or additional payment will be made for temporary wedges constructed, maintained, and removed under 00620.40(d), or for replacement of cutting teeth.

Section 00622 - Grinding Concrete Pavement

Description

00622.00 Scope - This work consists of grinding existing portland cement concrete pavement.

Equipment

00622.20 Grinding Equipment - Provide self-propelled grinding equipment that:

- Has diamond embedded grinding blades that will produce a smooth textured surface.
- Is able to grind a strip at least 4 feet wide.
- Can remove slurry and residue during the grinding operation.

00622.21 Smoothness Testing Equipment:

(a) Straightedge - Provide one 12-foot straightedge.

(b) Profilograph - Provide a California-type profilograph that:

- Can determine the profile index of the pavement according to ODOT TM 770.
- Is either computerized or not computerized.
- Is equipped with a recording device.
- Is calibrated, in good working condition, and ready for operation before concrete pavement grinding begins.

(c) Profilometer - Provide a profilometer that:

- Is capable of generating the equivalent California-type profilograph plot and values according to ODOT TM 770.
- Employs an accelerometer established inertial profiling reference and a laser height sensing instrument to produce a true profile of the pavement surface.
- Is capable of reporting elevations with a resolution of 0.004 inch or finer at an interval of 6 inches or less.
- Is able to generate the locations and heights of all bumps and dips.
- Is calibrated, in good working condition, and ready for operation before performing smoothness measurements.

Before beginning smoothness measurements, have the profilograph or profilometer operators meet with the Engineer at a mutually agreed upon time to discuss all aspects of smoothness measurements on the Project.

Labor

00622.30 Smoothness Testing Operators - Provide operators for the profilograph and the profilometer that are experienced in the operation of the equipment.

Construction

00622.40 Preparation - Complete full depth concrete repairs, spall repairs, and joint repairs according to Section 00758 in the area to be ground before beginning grinding operations.

00622.41 Grinding - Taper grind to match the elevation of bridge decks, bridge approach slabs, and at the ends of the grind area.

Provide positive lateral drainage by maintaining a constant cross slope between grinding extremities in each lane. Grind transition, auxiliary or ramp lane from the mainline edge as shown.

Schedule and proceed with the grinding operation that will produce a uniform finished surface. Grind the pavement in a longitudinal direction beginning and ending at lines normal to the pavement centerline.

Do not grind roadway shoulders unless shown. Do not encroach on traffic movement outside the work area. Do not damage underlying surfaces, cause fractures, or spall joints.

Perform grinding within one of the following aggregate hardness tolerances:

	Aggregate Hardness Tolerance	
	Moderately Hard Aggregate	Hard Aggregate
Abrasion (AASHTO T96)	> 20.0	≤ 20.0
Blade segment thickness	0.100" to 0.125"	0.100" to 0.125"
Land area between grooves*	0.100" to 0.135"	0.080" to 0.110"
Texture depth**	Target of 1/16" with averages between 1/32" to 3/32"	

* Based on an average of a minimum of 10 measurements across the ground width for one pass.

** Based on an average of a minimum of 6 measurements across the ground width for one pass.

The Project's aggregate hardness tolerance will be listed in the Special Provisions.

00622.42 Removal and Disposal of Material - Remove all grinding materials as the grinding operation is performed. Dispose of all materials according to 00290.20.

00622.43 Surface Finish - Provide a pavement surface that:

- Meets the aggregate hardness tolerances of 00622.41.
- Is true to grade.
- Has a longitudinal line-type texture with corrugations parallel to the outside pavement edge which present a narrow ridge corduroy type appearance.
- Has at least 95 percent of the pavement surface textured. When approved, depressed pavement areas and other localized depressed areas will not require texturing.

Extra depth grinding is not required where minor depressions are detected in the existing pavement.

Provide at least a 2.0 inch longitudinal overlap when producing multiple passes but keep overlaps over 2.0 inches to a minimum.

Maintenance

00622.60 Correction of Defects - Correct the following deficiencies at no additional cost to the Agency:

- Pavement corrugation due to "out-of-round" wheels on grinding equipment.

- Improper cutting head operations that cause the head to ride in and out of the pavement when encountering light and heavy cuts.
- Depressions created from improper starting and stopping during the cutting operation.
- Unground ridges left in the pavement from defective blades in the grinding head.

Reground the entire lane width in areas that require corrective work.

Finishing and Cleaning Up

00622.70 Pavement Smoothness - Perform smoothness testing under the observation of the Engineer. If the Contractor performs smoothness measurements on a day other than the day pavement grinding is performed, all additional traffic control required for the smoothness testing, but not required for other work, will be at no additional cost to the Agency.

(a) Straightedge Testing and Tolerance - Test the surface with a 12 foot straightedge perpendicular to the centerline. The pavement surface shall not vary by more than 1/4 inch. Straightedge testing is not required across longitudinal joints or outside the ground area.

(b) Graphic Profile Testing and Tolerance:

(1) General - Test the longitudinal surface of textured surfaces for smoothness by the graphic profile testing (GPT) method according to ODOT TM 770. Before beginning grinding on the Project, demonstrate the profilograph and profilometer operation by conducting a calibration test according to ODOT TM 770, and running the machine twice over a 0.1 mile section of pavement with repeating results.

The pavement shall have a profile index of 7.0 inches per mile or less for each wheel path in each 0.1 mile segment or partial segment, and shall have no individual deviation of 0.3 inch or more.

(2) Surface Test - Provide a complete graphic profile by running the profilograph or profilometer over the full length of the lanes ground and 50 feet beyond the ends. Provide a profile in each vehicle wheel path by running profiles on the pavement surface along lines parallel to and approximately 3 feet from each edge of the pavement and 3 feet from each side of longitudinal joints.

(3) Determining Profile Index:

a. General - Determine the profile index of pavement in 0.1 mile segments and partial segments. A segment will end and will be considered a partial segment and a new segment will begin when the segment sequence is interrupted by stage construction or by profiled areas excluded from the GPT smoothness requirements.

The following profiled areas of pavement are excluded from the GPT smoothness requirements:

- Profiles extending beyond the Project ends
- Bridge decks and bridge panels
- First and last 13 feet at the Project ends and bridge end panels
- Pavement on horizontal curves with radii less than 1,000 feet

Include and analyze separately those areas in the profile charts that are not subject to the GPT smoothness profile index requirements.

b. Method of Analysis - Determine the profile index and individual deviations of 0.3 inch or more by analyzing the profile charts according to ODOT TM 770. Provide the profile charts and results to the Engineer.

(c) Failure To Meet Graphic Profile Requirements - Correct all segments or partial segments that exceed the requirements of 00622.70(b) in either wheel path by regrounding to the specified limits except correct deviations of 0.3 inch or more at least to the edge of the blanking band. The Engineer will determine and mark the areas to be profiled.

Retest all segments requiring corrective work for the entire length according to 00622.70(b) under the observation of the Engineer. All corrective work and graphic profiling, including traffic control, will be at no additional cost to the Agency.

Measurement

00622.80 Measurement - The quantities of concrete pavement grinding will be measured on the area basis.

Payment

00622.90 Payment - The accepted quantities of concrete pavement grinding will be paid for at the Contract unit price per square yard for the item "Grind Concrete Pavement".

Payment will be payment in full for furnishing all equipment, labor, and incidentals necessary to complete the work as specified.

Section 00635 - Grid-Rolled Aggregate Subbase

Description

00635.00 Scope - This work consists of furnishing, placing, and compacting with a perforated or grid-type roller, one or more layers of aggregate mixed with water, on a prepared surface to the lines, grades, thicknesses and cross sections shown or established.

Materials

00635.10 Materials - Furnish grid rolled aggregate subbase rock material having a maximum size of 6 inches and meeting the following requirements:

- **Abrasion** - The source materials for aggregate subbase shall not exceed 45 percent wear when tested according to AASHTO T 96.
- **Sand Equivalent** - Aggregate subbase material shall have a sand equivalent of not less than 25 when tested according to AASHTO T 176.

Equipment

00635.20 Compacting Equipment - Provide perforated or grid-type metal twin-drum rollers meeting the following requirements:

- Drums with an outside diameter of at least 5 feet.
- Maximum drum width of 32 inches.
- Capable of a 15 ton loading. The specific loaded weight will be as directed.

Use self-propelled or tractor pulled type rollers of sufficient size to propel it at 15 miles per hour.

Construction

00635.40 Preparation of Foundation - Provide a firm surface on which aggregate subbase is to be placed according to Section 00320, 00330, or 00610 as applicable.

00635.42 Thickness and Number of Layers - If the required compacted depth of the subbase exceeds 8 inches, construct it in two or more layers of nearly equal thickness. The maximum compacted thickness of any one layer shall not exceed 8 inches.

00635.43 Shaping and Compacting - Compact each layer of the subbase by as many passes of the roller as necessary to attain the desired fracture and compaction of the material. Operate the roller at the highest speed possible without bounce and without unevenness of compaction.

Perform blading and watering as necessary to provide uniformity of crown, cross section, and compaction.

Apply water according to Section 00340 and as directed.

Maintenance

00635.60 Care of the Work - After constructing each layer and completing the subbase, maintain the layer to specified conditions, and prevent or repair segregation, raveling, or rutting until it is covered with a following layer or until all Contract work is completed.

Measurement

00635.80 Measurement - The quantities of grid-rolled aggregate subbase will be measured on the area basis, constructed to the full thickness. The thickness will be identified on the plans. The surface area will be determined by horizontal measurements. In areas where directed to grid-roll to thicknesses other than identified on the plans, the areas will be adjusted by converting to an equivalent number of square yards on a proportionate volume basis.

Payment

00635.90 Payment - The accepted quantities of grid-rolled aggregate subbase will paid for at the Contract unit price, per square yard, for the item "Grid-Rolled Aggregate Subbase, _____ inches Thick".

The thickness of the subbase will be inserted in the blank.

Payment will be payment in full for furnishing and placing all materials, and for furnishing all equipment, labor, and incidentals necessary to complete the work as specified.

No separate or additional payment will be made for water used to bring the mixture to optimum moisture content or for water used in the care of the work.

Section 00640 - Aggregate Base and Shoulders

Description

00640.00 Scope - This work consists of furnishing and placing one or more courses of aggregate base and/or shoulders on a prepared surface to the lines, grades, thicknesses and cross sections shown or established when 00640 is specified or when a working platform is shown on the plans. When neither 00640 nor 00641 are specified, furnish and place aggregate base according to 00641.

00640.05 Working Platform Definition - This work consists of placing a layer of material on an excavated surface to support construction operations over a weak subgrade.

Materials

00640.10 Materials - Furnish aggregates of either 1" - 0 or 3/4" - 0 as the Contractor elects. Use clean, hard, durable aggregates, reasonably well-graded from the maximum size to dust.

00640.16 Acceptance of Aggregates - Acceptance will be visual by the Engineer.

Construction

00640.40 Preparation of Foundation - Provide a firm surface on which aggregates are to be placed according to 00641.40, except a working platform shall be excavated according to 00330.41(f).

00640.41 Hauling and Placing - Transport the aggregate to the job site, add water to obtain proper moisture content, and place on the prepared surface or material by means acceptable to the Engineer.

Do not place shoulder aggregates on the top lift of newly constructed EAC or open-graded pavement.

00640.42 Thickness and Number of Layers:

(a) Base - If the required compacted depth of the base course exceeds 6 inches, construct it in two or more layers of nearly equal thickness. The maximum compacted thickness of any one layer shall not exceed 6 inches.

Place each layer in spreads as wide as practical and to the full width of the course before a succeeding layer is placed.

(b) Shoulders - Place shoulder aggregates in a single layer, or two or more layers of nearly equal thickness. The maximum compacted thickness of any one layer shall not exceed 9 inches.

(c) Working Platform - Place aggregates in one layer to the thickness shown in the plans, except the maximum compacted thickness of each layer shall not exceed 12 inches. Place the first layer of aggregate backfill on the geotextile by back-dumping or other means to provide physical separation between the geotextile and the wheels or tracks of the equipment.

00640.43 Shaping and Compacting - Compact each layer of material placed in shoulder and base areas by rollers conforming in general to 00641.24 or as directed.

Shape and maintain the surface of each layer during the compaction operations to meet the requirements of 00640.44. Produce a uniform texture and firmly key the aggregates.

Apply water over the materials for proper compaction according to Section 00340, and as directed.

Continue the compactive effort until there is no reaction or yielding observed under the compactor, except the working platform shall be tested according to 00641.44(a).

00640.44 Surface Tolerance - The finished surface and the surface of each underlying layer of the aggregate shall parallel the established grade and cross section for the finished surface within 1/2 inch.

The finished surface of the compacted aggregate base, when tested with a 12 foot straightedge, shall not vary from the testing edge by more than 1/2 inch at any point. Furnish and operate the straightedge as directed.

Maintenance

00640.60 Care of the Work - After construction of each layer and completion of base, maintain the layer to specified conditions and prevent or repair segregation, raveling, or rutting, until it is covered with a following layer or until all work is completed or the area basis. In areas where directed to stabilize to a depth other than shown, the areas will be adjusted by converting to an equivalent number of square yards on a proportionate volume basis.

Measurement

00640.80 Measurement - The quantities of aggregate will be measured on the weight basis, in the hauling vehicle or the area basis. In areas where directed to stabilize to a depth other than shown, the areas will be adjusted by converting to an equivalent number of square yards on a proportionate volume basis.

Payment

00640.90 Payment - The accepted quantities of aggregates will be paid for at the Contract unit price, per unit of measurement, for the following items:

Pay Item

Unit of Measurement

- | | |
|--|-------------|
| (a) Aggregate Base | Ton |
| (b) Aggregate Shoulders | Ton |
| (c) Aggregate Working Platform, _____ inches thick | Square Yard |

Payment will be payment in full for furnishing and placing all materials, and for furnishing all equipment, labor, and incidentals necessary to complete the work as specified.

No separate or additional payment will be made for water used to obtain proper compaction and in the care of the work.

Section 00641 - Aggregate Subbase, Base, and Shoulders

Description

00641.00 Scope - This work consists of furnishing and placing one or more layers of aggregates, mixed with water, on a prepared surface to the lines, grades, thicknesses and cross sections shown or established.

Materials

00641.10 Materials:

(a) Base and Shoulder Aggregate - Aggregate for bases and shoulders shall be sized as specified. Base aggregate shall be dense-graded unless otherwise specified. Shoulder aggregates shall be either 1" - 0 or 3/4" - 0 size as the Contractor elects.

Furnish base and shoulder aggregates meeting the following requirements:

Dense-Graded Base Aggregate	02630.10
Open-Graded Aggregate.....	02630.11
Shoulder Aggregate	02640

(b) Subbase Aggregate - Aggregate for subbases shall be crushed or uncrushed, including sands, reasonably well graded from coarse to fine.

Maximum size aggregate shall not exceed 75 percent of the compacted thickness of the layer in which it is incorporated. Aggregates passing the 1/4 inch sieve shall not be less than 10 percent nor more than 50 percent of the whole, by weight. No more than 10 percent of the aggregate shall pass the No. 100 sieve. Within these limits, the subbase aggregate gradation shall be adequate to produce a dense, firm base when placed and compacted.

(1) Grading - All of the grading requirements are given as percentages by weight. The gradation will be determined by sieve analysis according to AASHTO T 27.

(2) Abrasion - The source materials for aggregate subbase shall not exceed 45 percent wear when tested according to AASHTO T 96 unless otherwise approved.

(3) Sand Equivalent - Aggregate subbase will be tested according to AASHTO T 176 and shall have a sand equivalent of not less than 25.

(c) Reclaimed Materials – Recycled material from crushed plain Portland Cement Concrete (PCC) or Reclaimed Asphalt Pavement (RAP) may be substituted for up to 50% of the base, shoulder, and subbase aggregate.

00641.11 Stockpiling - If the produced aggregates are to be stockpiled, prepare the stockpile site and pile the materials according to 00680.40 and 00680.41.

00641.12 Limits of Mixture - Provide a mixture of aggregate and water having a uniform moisture content sufficient to obtain the required compaction. Proportions will be in percentages by weight and will be known as the Mix Design. Determine the proportion of aggregate and water according to the MFTP. The amount of water for the Mix Design will be based on the dry weight of the aggregate.

When introducing water at the mixing plant, furnish the mixture with a tolerance of ± 2 percent of the optimum water content at the time of mixing. If approved, excess percentage of water may be allowed. The Agency will treat excess percentage of water according to 00641.80(d).

00641.15 Quality Control:

(a) Aggregate Production Quality Control - Have a CAgT perform sampling and testing of aggregates according to Section 00165 and the MFTP. Statistically evaluate the aggregates according to Section 00165.

(b) Preproduced Aggregate - Compliance of aggregates produced and stockpiled before issuance of Notice to Proceed will be determined according to (1) or (2) below.

(1) Continuing production records meeting the requirements of Section 00165 and the MFTP.

(2) Sampling and testing the entire stockpile according to Section 00165 and the MFTP.

In addition, the material shall meet the requirements of 00641.10.

00641.16 Acceptance of Aggregates - Acceptance will be according to Section 00165.

(a) Stockpiled Aggregate for Aggregate Base and Shoulders - Acceptance will be based on the Contractor's quality control testing, if verified, as required in Section 00165.

(1) Aggregate Gradation - A stockpile contains specification aggregate gradation when the Quality Level (QL) for each sieve size, calculated according to 00165.40, is equal to or greater than the QL indicated in Table 00165-2 for a PF of 1.00. Each required sample represents a subplot. When the QL indicated in Table 00165-2 yields a PF of less than 1.00 for any sieve size, the material is non-specification.

(2) Non-specification Aggregate Gradation - Stockpiled aggregates having non-specification aggregate gradation will be rejected unless the non-specification material is removed from the stockpile. Do not add additional material to the stockpile until enough non-specification material has been removed so that the QL for each sieve size is equal to or greater than the QL in Table 00165-2 for a 1.00 PF.

No payment will be made for non-specification materials.

(b) Aggregate Base and Shoulder Mixture - Acceptance testing will be performed by the Engineer at the times and locations determined by the Engineer on random samples obtained immediately following mixing with water according to the MFTP. For non-specification mixture the Engineer will determine the appropriate price reduction or order its removal from the work according to 00150.25.

(c) Aggregate Subbase - Aggregate subbase will be accepted based on the Engineer's visual inspection. Samples will be obtained and tested for compliance with 00641.10 by the Engineer if it is suspected that the material does not meet Specifications.

Equipment**00641.20 Mixing Plant** - Mix aggregate and water by one of the following methods:

(a) Mixing Plant - Mix with a pug mill, rotary mixer, or other equipment at a mixing plant that:

- Has adjustable weighing or calibrated feeders, and other equipment that produces uniform, non-segregated, specified mixtures.
- Discharges water into the mixer by weighing or metering. The device shall be adjustable and shall assure uniform water content in the mixture.

- Has mixing blades or paddles of proper size, adjustment and clearance to provide uniform mixture.

(b) Road Mix - Motor grader or other suitable equipment.

00641.21 Hauling Equipment - Provide mixture hauling vehicles capable of hauling and depositing the mixture with a minimum of mix segregation.

00641.22 Spreading Equipment - Provide equipment capable of spreading the material and striking it off to designated line, grade, and transverse slope without segregation, dragging, or fracture of aggregate.

00641.24 Compacting Equipment - Provide self-propelled rollers and compactors capable of reversing without backlash. Rollers and compactors shall have a gross static weight of at least 8 tons, and shall be capable of compacting to specified density while the mix is still moist.

Labor

00641.30 Quality Control Personnel - Provide technicians having CEBT, CAgT, and CDT technical certifications.

Construction

00641.40 Preparation of Foundation - Provide a firm surface or material, on which aggregates are to be placed, according to Sections 00320, 00330, or 00610 as applicable.

00641.41 Mixing, Hauling, and Placing - Add water to the aggregate while mixing to provide a moisture content according to 00641.12.

Thoroughly mix the combined aggregate and water for as long as necessary to produce a homogenous mixture with all aggregate particles uniformly coated with water. Mix, haul and place the material by one of the following methods:

(a) Stationary Mixing Plant - Combine materials in a pug mill or rotary mixer.

Deliver and deposit the mixture without delay. Deliver the mixture to the spreading equipment by direct deposit into its receiving device, or by placing in uniform windrows in front of the equipment.

(b) Road Mix - Place materials for each layer, add water and mix with motor grader until homogeneous mixture is achieved.

Do not place aggregate shoulder material on the top lift of newly constructed EAC or open-graded pavement.

00641.42 Placing Aggregate Base or Subbase on Geotextile - When subgrade or drainage geotextile is required between the subgrade and base, place the first lift of material directly on the fabric, without road mixing and without operating equipment on the fabric.

00641.43 Thickness and Number of Layers:

(a) Aggregate Base Courses - If the required compacted depth of the base course exceeds 6 inches, construct it in two or more layers of nearly equal thickness. The maximum compacted thickness of any one layer shall not exceed 6 inches unless approved.

Place each layer in spreads as wide as practical and to the full width of the course before a succeeding layer is placed.

(b) Aggregate Subbase Courses - The maximum compacted thickness of any one layer shall not exceed 9 inches unless approved.

(c) Shoulder Courses - Place aggregates in shoulder areas, other than as part of the base course, in one layer, or in two or more layers of nearly equal thickness. The maximum compacted thickness of any one layer shall not exceed 9 inches.

00641.44 Shaping and Compacting:

(a) Aggregate Base Courses:

(1) Dense-graded Aggregates - Begin compaction of each layer of dense-graded aggregates immediately after the material is spread and continue until a density of not less than 95 percent of the maximum density has been achieved when tested according to AASHTO T-99 Method D, as corrected for oversize by AASHTO T-224-1996~~the MFTP~~.

If RAP is used, the nuclear density measurement method shall be modified as follows:

- a. use the nuclear gauge to determine the in-place wet density;
- b. collect a 2-pound sample of the material from the compacted aggregate base layer for each 250 cubic yards of material determine the moisture content of the samples per AASHTO T 255;
- c. calculate the dry density of the in-place aggregate base material using the moisture content of the material closest to the location of the nuclear density test.

(2) Open-graded Aggregates - Compact the surface of each layer of open-graded aggregates using rollers conforming to 00641.24. Roll until there is no appreciable reaction or yielding under the compactor.

Shape and maintain the surface of each aggregate layer during the compaction operations to produce a finished surface meeting the requirements of 00641.45.

Apply additional water over the materials for proper compaction, according to Section 00340 and as directed.

The finished road base shall be firm and unyielding. The surface shall be proof rolled in accordance with ODOT TM 158 with a fully loaded 10 to 12 cubic yard dump truck or equivalent. Deflection shall not exceed 1/4 inch. Correct any areas not meeting this requirement.

(b) Aggregate Subbase and Shoulder Courses - Compact each layer of aggregate subbase and shoulder material until no reaction or yielding is observed under the compactor.

00641.45 Surface Tolerance - The finished surface of the aggregate and the surface of each underlying layer shall parallel the established grade and cross section for the finished surface within 1/2 inch.

The finished surface of the compacted aggregate, when tested with a 12 foot straightedge, shall not vary from the testing edge by more than 1/2 inch at any point. Furnish and operate the straightedge as directed.

Maintenance

00641.60 Care of the Work - After construction of each layer and completion of base, maintain the layer to specified conditions and prevent or repair segregation, raveling, or rutting until it is covered with a following layer or until all work is completed.

Measurement

00641.80 Measurement - The quantities of aggregate mixture will be measured on the weight basis, on the volume basis, or on the area basis according to the following:

(a) Weight Basis - When measurement is by weight, quantities will be measured in the hauling vehicle, after mixing.

(b) Volume Basis - When measurement is by volume, quantities will be measured in the hauling vehicle.

(c) Area Basis - When measurement is by area, the quantity will be the number of square yards of aggregate base constructed to the full thickness. The surface area will be determined by horizontal measurements. Each area constructed with varying thicknesses, as directed or shown, will be adjusted by converting it to an equivalent area at the pay item thickness on a proportionate volume basis.

(d) Adjustment of Water in Mixture - If the water in the aggregate mixture placed according to 00641.41(a) exceeds the percentage established in the mix design by more than 2 percent, the excess percentage of water will be deducted from the measurement of the mixture. Determination of excess water will be made by the same procedure used in setting the water content of the Mix Design under 00641.12 or converted to the equivalent volume.

If aggregates are stationary plant mixed, no separate measurement will be made for water added at the plant to bring the material to optimum moisture content.

If aggregates are road mixed, water used to bring the mixture to optimum moisture content will be measured according to 00340.80.

Payment

00641.90 Payment - The accepted quantities of aggregates will be paid for at the Contract unit price, per unit of measurement, for the following items:

Pay Item	Unit of Measurement
(a) Aggregate Subbase	Ton or Cubic Yard
(b) Aggregate Base	Ton or Cubic Yard
(c) _____ Aggregate Base	Ton or Cubic Yard
(d) Plant Mix Aggregate Base.....	Ton or Cubic Yard
(e) Plant Mix _____ Aggregate Base.....	Ton or Cubic Yard
(f) Aggregate Shoulders	Ton or Cubic Yard
(g) Aggregate Base, _____ Inches Thick	Square Yard

Items (b) and (d) will apply when the Contractor has the option of furnishing one or another of two or more designated sizes of aggregates.

In items (c) and (e), the designated size of aggregate to be used will be inserted in the blank.

In item (g), the depth of aggregate base will be inserted in the blank.

Payment will be payment in full for furnishing and placing all materials, and for furnishing all equipment, labor, and incidentals necessary to complete the work as specified.

Aggregate placed beneath sidewalk and under or around other structures and facilities shall be incidental to the sidewalk of other structural item.

No separate or additional payment will be made for water used in the mixture, mixed and placed according to 00641.41(a), subject to the limitations of 00641.80(d).

No separate or additional payment will be made for water used in the care of the work according to 00641.60.

00641.91 Material on Hand - Payment for stockpiled materials on hand may be allowed according to 00195.60, subject to the requirements of 00641.10, 00641.15, 00641.16(a), and subject to QA verification.

Section 00680 - Stockpiled Aggregates

Description

00680.00 Scope - This work consists of furnishing crushed rock or other aggregates in stockpiles at the places and in the manner specified.

Materials

00680.10 Sources of Material - Obtain the material to be furnished in stockpiles from sources according to 00160.60.

00680.11 Aggregates - Furnish aggregates meeting the following requirements:

(a) Aggregate Base and Shoulder Aggregate - Furnish aggregates in stockpiles of the sizes specified and conforming to the requirements of 00641.10.

(b) Emulsified AC Aggregate - Furnish aggregates in stockpiles of the following sizes or as specified:

1" - 1/2"
 3/4" - 1/2"
 1/2" - 1/4"
 3/8" - 1/4"
 3/8" - No. 4
 3/8" - No. 8

Aggregates in stockpiles shall conform to the following requirements:

(1) Quality - Provide aggregates meeting the requirements of 00715.10(a), (c), (d), (e) and (f).

(2) Grading - Perform sieve analysis according to AASHTO T 27 and AASHTO T 11. Provide grading for the designated size aggregate according to the following:

Sieve Size	Designated Sizes					
	1" - 1/2"	3/4" - 1/2"	1/2" - 1/4"	3/8" - 1/4"	3/8" - No. 4	3/8" - No. 8
Percent Passing (by weight)						
1"	100	100				
3/4"	95 - 100	90 - 100	100			
1/2"	60 - 90	0 - 10	85 - 100	100	100	
3/8"	-	-	-	85 - 100	80 - 100	100
1/4"	15 - 30	0 - 2	0 - 15	0 - 15	10 - 40	-
No. 4	-	-	-	-	-	45 - 65
No. 8	0 - 7	-	0 - 4	-	0 - 6	0 - 10
No. 30	-	-	-	0 - 2	0 - 2	-
No. 200	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2
No. 200 *	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1

* In gravels

00680.15 Aggregate Production Quality Control - Provide quality control during production of aggregate according to Section 00165. Sampling and testing shall be performed by a CAgT at the minimum frequency schedule indicated in the MFTP for Section 00641, or according to Section 00715, as applicable. Aggregates will be evaluated for compliance according to the following:

(a) Gradation - Analyze gradation statistically according to Section 00165. A stockpile contains specification aggregate when the Pay Factor (PF) for each sieve size calculated according to 00165.40 is equal to or greater than 1.00. Each required sample represents a subplot.

When the results from Table 00165-2 yield a Pay Factor of less than 1.00 for any sieve size, the material is non-specification. The Engineer will reject any stockpile of aggregate containing non-specification material unless the non-specification material is removed from the stockpile. Do not add additional material to such a stockpile until enough non-specification material is removed so that the PF for each sieve size is equal to or greater than 1.00.

(b) Other Tests - Stop production, make appropriate operational adjustments, and remove all failing material from the stockpile whenever a quality control test result, other than sieve analysis, does not meet Specifications. Document operational adjustments made and notify the Engineer prior to resuming production.

00680.16 Acceptance of Aggregate - The Contractor's quality control tests will be used for acceptance of aggregates if verified by the Agency's quality assurance program. The Agency will perform aggregate production quality assurance according to the following:

(a) ODOT-Administered Projects - Quality assurance testing on projects administered by ODOT will be performed according to Section 00165, the MFTP and the ODOT Quality Assurance Program.

(b) Projects Administered by Other Agencies - The quantity of quality assurance testing on projects administered by Agencies other than ODOT will be at the discretion of the Agency or as specified.

Equipment

00680.20 Rock Crusher - Comply with the following:

(a) Permits - Before crushing rock for the Project, provide the Agency with copies of permits according to 00160.70.

(b) Crusher - Furnish rock crushers capable of producing rock meeting these Specifications. Use an impact crusher of sufficient size and capable of producing aggregate in cubical form, free from sharp points or slivers.

00680.21 Conveyor - Provide conveyors capable of reaching a minimum distance of 70 feet, to stockpile sanding materials in sand sheds without segregation during stockpiling.

00680.22 Hauling Equipment - Provide vehicles for hauling crushed aggregates capable of discharging the materials without segregation.

Labor

00680.30 Quality Control Personnel - Provide a technician having a CAgT technical certification.

Construction

00680.40 Preparation of Sites:

(a) Source Sites - Prepare and develop the source site according to the terms of the source permit and source development plan in the Special Provisions.

(b) Stockpile Sites - Clear, level, and prepare stockpile sites as directed.

00680.41 Piling of Materials - Place each separate designated size of material to be stockpiled at a given site in a separate stockpile. Locate each stockpile to occupy as small an area as practical, and separate each pile so that working room will be adequate for removing the materials later. Height of the piles shall not be less than 8 feet, nor side slopes flatter than 1V:1.5H, unless directed. Except in sand sheds, stockpile sanding materials to a height of 15 feet, or as directed.

Place the material in stockpiles with a minimum of segregation. Unless otherwise allowed, place the material in stockpiles in horizontal layers not more than 4 feet in thickness.

00680.42 Places of Delivery - Places of delivery and the tentative plans of distribution of the materials will be shown or specified.

00680.43 Agency's Right to Materials - If the Engineer finds it necessary, the Agency may take materials from stockpiles before the stockpiles have been completed and measured, or may take a part of the materials intended for placement in stockpiles, in trucks or other vehicles at the plant.

Finishing and Cleaning Up

00680.70 Cleaning Up Source Sites - Clean up the source sites according to the terms of the source permit and source development plan in the Special Provisions.

Measurement

00680.80 Measurement - The quantities of each designated size of material will be measured according to the following:

- **Weight Basis** - When measurement is by weight, the quantities of each designated size of material will be measured on the weight basis, in the hauling vehicle.
- **Volume Basis** - When measurement is by volume, the quantities of each designated size of material will be measured on the volume basis, by cross-section measurement of the completed stockpiles, with no allowance for settlement or shrinkage.

00680.81 Materials Taken from Stockpiles Prior to Completion - Materials taken by the Agency according to 00680.43 will be measured in the Agency's hauling vehicles. If measurement is on the volume basis, the vehicle measurement will be converted to equivalent stockpile measurement at the ratio of 1.00 cubic yard, vehicle measurement to 0.95 cubic yard, stockpile measurement. If measurement is on the weight basis, the weight will be determined in the same manner and by the same means as used in determining the weight of materials stockpiled and paid for under the Contract.

Payment

00680.90 Payment - The accepted quantities of each size of specified material will be paid for at the Contract unit price, per ton or cubic yard, for the item "_____ Material In Stockpile".

The respective sizes of stockpiled aggregates will be inserted in the blank.

Payment will be payment in full for furnishing and placing all materials in stockpiles and sand sheds, and for furnishing all equipment, labor, and incidentals necessary to complete the work as specified.

No separate or additional payment will be made for source development and clean-up, preparation of stockpile sites, hauling of stockpile materials, or placing materials in sand sheds.

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